



**[6450-01-P]**

**DEPARTMENT OF ENERGY**

**10 CFR Part 431**

**[Docket No. EERE-2011-BT-STD-0029]**

**RIN 1904-AC47**

**Energy Conservation Program for Certain Industrial Equipment: Energy Conservation Standards and Test Procedures for Commercial Heating, Air-Conditioning, and Water-Heating Equipment**

**AGENCY:** Office of Energy Efficiency and Renewable Energy, Department of Energy.

**ACTION:** Supplemental notice of proposed rulemaking.

**SUMMARY:** The U.S. Department of Energy (DOE) proposed to amend its energy conservation standards for several classes of commercial heating, air-conditioning, and water-heating equipment and to adopt new energy conservation standards for computer room air conditioners in a January 2012 notice of proposed rulemaking (January 2012 NOPR). The levels that DOE proposed to adopt were equivalent to the efficiency levels contained in the American National Standards Institute (ANSI)/American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE)/Illuminating Engineering Society of North America (IESNA) Standard 90.1-2010 (ASHRAE Standard 90.1-2010). In addition, DOE proposed in the January 2012 NOPR to update the current Federal test procedures, or for certain equipment types adopt new test procedures, to incorporate by reference the most current versions of several relevant industry test procedures specified in ASHRAE Standard 90.1-2010. The amendments

proposed in today's supplemental notice of proposed rulemaking (SNOPR) would modify the definition of "computer room air conditioner" initially proposed in the January 2012 NOPR and incorporate additional provisions to clarify the proposed test procedure provisions for commercial package air-conditioning and heating equipment and variable refrigerant flow systems. DOE is also proposing to include with modification certain provisions from Air-Conditioning, Heating, and Refrigeration Institute (AHRI) operations manuals in its test procedures that would clarify the application of the DOE test procedures and harmonize DOE testing with the testing performed by industry.

**DATES:** DOE will accept comments, data, and other information regarding this SNOPR no later than April 2, 2012. For details, see section V, "Public Participation" of this SNOPR.

**ADDRESSES:** Any comments submitted must identify the SNOPR on Energy Conservation Standards and Test Procedures for ASHRAE Standard 90.1 Products, and provide docket number EERE-2011-BT-STD-0029 and/or Regulatory Information Number (RIN) 1904-AC47.

Comments may be submitted using any of the following methods:

1. Federal eRulemaking Portal: [www.regulations.gov](http://www.regulations.gov). Follow the instructions for submitting comments.
2. E-mail: [ASHRAE90.1-2011-STD-0029@ee.doe.gov](mailto:ASHRAE90.1-2011-STD-0029@ee.doe.gov). Include docket number EERE-2011-BT-STD-0029 and/or RIN 1904-AC47 in the subject line of the message.
3. Mail: Ms. Brenda Edwards, U.S. Department of Energy, Building Technologies Program,

Mailstop EE-2J, 1000 Independence Avenue, SW., Washington, DC 20585-0121. If

possible, please submit all items on a compact disc (CD), in which case it is not necessary to include printed copies.

4. Hand Delivery/Courier: Ms. Brenda Edwards, U.S. Department of Energy, Building Technologies Program, 950 L'Enfant Plaza, SW., Suite 600, Washington, DC 20024. Telephone: (202) 586-2945. If possible, please submit all items on a CD, in which case it is not necessary to include printed copies.

No telefacsimilies (faxes) will be accepted. For detailed instructions on submitting comments and additional information on the rulemaking process, see section V of this document (Public Participation).

Docket: The docket is available for review at [www.regulations.gov](http://www.regulations.gov), including Federal Register notices, public meeting attendee lists and transcripts, comments, and other supporting documents/materials. All documents in the docket are listed in the [www.regulations.gov](http://www.regulations.gov) index. However, not all documents listed in the index may be publicly available, such as information that is exempt from public disclosure.

A link to the docket web page can be found at:

<http://www.regulations.gov/#!docketDetail;dct=FR%252BPR%252BN%252BO%252BSR%252BPS;rpp=25;po=0;D=EERE-2011-BT-STD-0029>. This web page contains a link to the docket

for this notice, along with simple instructions on how to access all documents, including public comments, in the docket. See section V, “Public Participation,” for further information on how to submit comments through [www.regulations.gov](http://www.regulations.gov).

For further information on how to submit a comment or review other public comments and the docket, contact Ms. Brenda Edwards at (202) 586–2945 or by email:

[Brenda.Edwards@ee.doe.gov](mailto:Brenda.Edwards@ee.doe.gov).

**FOR FURTHER INFORMATION CONTACT:** Mr. Mohammed Khan, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Program, Mailstop EE-2J, 1000 Independence Avenue, SW., Washington, DC 20585-0121. Telephone: (202) 586-7892. E-mail: [Mohammed.Khan@ee.doe.gov](mailto:Mohammed.Khan@ee.doe.gov).

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## I. Introduction

The following section briefly discusses the statutory authority underlying today’s supplemental notice of proposed rulemaking, as well as some of the relevant historical background related to the establishment of energy conservation standards and test procedures for ASHRAE Standard 90.1 equipment.

#### A. Authority

Title III, Part C<sup>1</sup> of the Energy Policy and Conservation Act of 1975 (EPCA or the Act), Pub. L. 94-163 (42 U.S.C. 6311-6317, as codified), added by Pub. L. 95-619, Title IV, §441(a), established the Energy Conservation Program for Certain Industrial Equipment, which includes the commercial heating, air-conditioning, and water-heating equipment that is the subject of this

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<sup>1</sup> For editorial reasons, upon codification in the U.S. Code, Part C was redesignated Part A-1.

rulemaking.<sup>2</sup> In general, this program addresses the energy efficiency of certain types of commercial and industrial equipment. Relevant provisions of the Act specifically include definitions (42 U.S.C. 6311), energy conservation standards (42 U.S.C. 6313), test procedures (42 U.S.C. 6314), labelling provisions (42 U.S.C. 6315), and the authority to require information and reports from manufacturers (42 U.S.C. 6316).

EPCA contains mandatory energy conservation standards for commercial heating, air-conditioning, and water-heating equipment. (42 U.S.C. 6313(a)) Specifically, the statute sets standards for small, large, and very large commercial package air-conditioning and heating equipment, packaged terminal air conditioners (PTACs) and packaged terminal heat pumps (PTHPs), warm-air furnaces, packaged boilers, storage water heaters, instantaneous water heaters, and unfired hot water storage tanks. Id. In doing so, EPCA established Federal energy conservation standards that generally correspond to the levels in ASHRAE Standard 90.1, as in effect on October 24, 1992 (i.e., ASHRAE Standard 90.1-1989), for each type of covered equipment listed in 42 U.S.C. 6313(a).

In acknowledgement of technological changes that yield energy efficiency benefits, Congress further directed DOE through EPCA to consider amending the existing Federal energy conservation standard for each type of equipment listed, each time ASHRAE Standard 90.1 is amended with respect to such equipment. (42 U.S.C. 6313(a)(6)(A)) For each type of equipment, EPCA directs that if ASHRAE Standard 90.1 is amended, DOE must publish in the Federal Register an analysis of the energy savings potential of amended energy efficiency standards within 180 days of the amendment of ASHRAE Standard 90.1. (42 U.S.C. 6313(a)(6)(A)(i))

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<sup>2</sup> All references to EPCA in this document refer to the statute as amended through the Energy Independence and Security Act of 2007, Pub. L. 110-140.

EPCA further directs that DOE must adopt amended standards at the new efficiency level in ASHRAE Standard 90.1, unless clear and convincing evidence supports a determination that adoption of a more-stringent level would produce significant additional energy savings and be technologically feasible and economically justified. (42 U.S.C. 6313(a)(6)(A)(ii)) If DOE decides to adopt as a national standard the efficiency levels specified in the amended ASHRAE Standard 90.1, DOE must establish such standard not later than 18 months after publication of the amended industry standard. (42 U.S.C. 6313(a)(6)(A)(ii)(I)) However, if DOE determines that a more-stringent standard is justified under 42 U.S.C. 6313(a)(6)(A)(ii)(II), then it must establish such more-stringent standard not later than 30 months after publication of the amended ASHRAE Standard 90.1. (42 U.S.C. 6313(a)(6)(B)) (In addition, DOE notes that pursuant to the EISA 2007 amendments to EPCA, under 42 U.S.C. 6313(a)(6)(C), the agency must periodically review its already-established energy conservation standards for ASHRAE products. Under this requirement, the next review that DOE would need to conduct must occur no later than six years from the issuance of a final rule establishing or amending a standard for a covered product.)

EPCA also requires that if a test procedure referenced in ASHRAE Standard 90.1 is updated, DOE must update its test procedure to be consistent with the amended test procedure in ASHRAE Standard 90.1, unless DOE determines that the amended test procedure is not reasonably designed to produce test results which reflect the energy efficiency, energy use, or estimated operating costs of the ASHRAE equipment during a representative average use cycle. In addition, DOE must determine that the amended test procedure is not unduly burdensome to conduct. (42 U.S.C. 6314(a)(2) and (4))

Additionally, the Energy Independence and Security Act of 2007 (EISA 2007; Pub. L. 110-140) amended EPCA to require that at least once every 7 years, DOE must conduct an

evaluation of the test procedures for all covered equipment and either amend test procedures (if the Secretary determines that amended test procedures would more accurately or fully comply with the requirements of 42 U.S.C. 6314(a)(2)-(3)) or publish notice in the Federal Register of any determination not to amend a test procedure. (42 U.S.C. 6314(a)(1)(A)) Under this requirement, DOE must review the test procedures for the various types of ASHRAE equipment not later than December 19, 2014 (i.e., 7 years after the enactment of EISA 2007). Thus, the final rule resulting from this rulemaking will satisfy the requirement to review the test procedures for the certain types of ASHRAE equipment addressed in this rulemaking (i.e., those equipment for which DOE has been triggered) within seven years.

On October 29, 2010, ASHRAE officially released and made public ASHRAE Standard 90.1-2010. This action triggered DOE's obligations under 42 U.S.C. 6313(a)(6), as outlined above. For a more complete discussion of authority, see DOE's January 17, 2012 NOPR. 77 FR 2356, 2359-61.

## B. Background

### 1. ASHRAE Standard 90.1-2010

As noted, ASHRAE released a new version of ASHRAE Standard 90.1 on October 29, 2010. The ASHRAE standard addresses efficiency levels and test procedures for many types of commercial heating, ventilating, air-conditioning (HVAC), and water-heating equipment covered by EPCA. ASHRAE Standard 90.1–2010 revised its efficiency levels for certain commercial equipment, but for the remaining equipment, ASHRAE left in place the preexisting levels (i.e.,



the efficiency levels specified in EPCA or the efficiency levels in ASHRAE Standard 90.1–2007). Specifically, DOE determined in the January 2012 NOPR that ASHRAE updated its efficiency levels for small, large, and very large water-cooled and evaporatively-cooled commercial package air conditioners; variable refrigerant flow (VRF) water-source heat pumps less than 17,000 Btu/h; and VRF water-source heat pumps at or greater than 135,000 Btu/h. ASHRAE Standard 90.1-2010 also revised its scope to include certain commercial equipment used for industrial and process cooling, namely “air conditioners and condensing units serving computer rooms.”

In addition, ASHRAE Standard 90.1-2010 updated the following referenced test procedures to the most recent version of the industry standards: AHRI 210/240-2008 (small commercial package air-conditioning and heating equipment); AHRI 340/360-2007 (large and very large commercial package air-conditioning and heating equipment); Underwriters Laboratories (UL) 727-2006 (oil-fired commercial warm-air furnaces); ANSI Z21.47-2006 (gas-fired commercial warm-air furnaces); and ANSI Z21.10.3-2004 (commercial water heaters). Lastly, ASHRAE Standard 90.1-2010 specified new test procedures for certain equipment, including: ASHRAE 127-2007 (computer room air conditioners); and AHRI 1230-2010 (variable refrigerant flow air conditioners and heat pumps).

## 2. Previous Rulemaking Documents

Subsequent to the release of ASHRAE Standard 90.1-2010, DOE published a notice of data availability (NODA) in the Federal Register on May 5, 2011 (May 2011 NODA) and requested public comment as a preliminary step required pursuant to EPCA when DOE considers

amended energy conservation standards for certain types of commercial equipment covered by ASHRAE Standard 90.1. 76 FR 25622. Specifically, in the May 2011 NODA, DOE presented a discussion of the changes found in ASHRAE Standard 90.1-2010, which included a description of DOE's evaluation of each ASHRAE equipment type in order for DOE to determine whether the amendments in ASHRAE Standard 90.1-2010 have increased efficiency levels. Id. at 25630-37. As an initial matter, DOE sought to determine which requirements for covered equipment in ASHRAE Standard 90.1, if any, were revised solely to reflect the level of the current Federal energy conservation standard (where ASHRAE is merely "catching up" to the current national standard), were revised but lowered, were revised to include design requirements without changes to the efficiency level, or had any other revisions made that did not increase the standard level, in which case, DOE was not triggered to act under 42 U.S.C. 6313(a)(6) for that particular equipment type. For those types of equipment in ASHRAE Standard 90.1 for which ASHRAE actually increased efficiency levels above the current Federal standard (i.e., water-cooled and evaporatively-cooled air conditioners; two classes of VRF water-source heat pumps with and without heat recovery; and computer room air conditioners (which were not previously covered)), DOE subjected that equipment to the potential energy savings analysis for amended national energy conservation standards based on: (1) the modified efficiency levels contained within ASHRAE Standard 90.1-2010; and (2) more-stringent efficiency levels. DOE presented its methodology, data, and results for the preliminary energy savings analysis developed for the water-cooled and evaporatively-cooled equipment classes in the May 2011 NODA for public comment. Id. at 25637-46. For the remaining equipment classes, DOE requested data and information that would allow it to accurately assess the energy savings potential of those equipment classes. Additionally, for single package vertical air conditioners and heat pumps,

although the levels in ASHRAE Standard 90.1-2010 were unchanged, DOE performed an analysis of their potential energy savings as required by 42 U.S.C. 6313(a)(10)(B). Lastly, DOE presented an initial assessment of the test procedure changes included in ASHRAE Standard 90.1-2010. Id. at 25644-47.

Following the NODA, DOE published a notice of proposed rulemaking in the Federal Register on January 17, 2012 (the January 2012 NOPR), and requested public comment. 77 FR 2356. In the January 2012 NOPR, DOE proposed amended energy conservation standards for small, large, and very large water-cooled and evaporatively-cooled commercial package air conditioners; variable refrigerant flow (VRF) water-source heat pumps less than 17,000 Btu/h; VRF water-source heat pumps at or greater than 135,000 Btu/h; and new energy conservation standards for computer room air conditioners. DOE presented its methodology, data, and results for its analysis of two classes of variable refrigerant flow water-source heat pumps and for its analysis of computer room air conditioners.

In addition, DOE's NOPR also proposed the adoption of amended test procedures for small commercial package air-conditioning and heating equipment; large and very large commercial package air-conditioning and heating equipment; commercial warm-air furnaces; and commercial water heaters. Furthermore, DOE proposed to adopt new test procedures for variable refrigerant flow equipment, single package vertical air conditioners and heat pumps, and computer room air conditioners. Following the publication of the NOPR, DOE held a public meeting on February 14, 2012 to receive feedback from interested parties on its proposals and analyses.

## **II. Summary of the Supplemental Proposed Rule**

This supplemental notice of proposed rulemaking builds upon the January 17, 2012 NOPR, which DOE hereby affirms, except for those provisions that are modified by this supplemental proposal. In overview, in today's SNOPR, DOE proposes to modify the definition of "computer room air conditioner" that was initially proposed in the January 2012 NOPR. DOE also proposes to include with modification certain provisions from AHRI operations manuals (OMs) in its test procedures that would clarify the application of the test procedures and harmonize DOE testing with the testing performed by industry.

At the February 14, 2012 public meeting, DOE came to better understand the overlap between the markets for comfort conditioning and computer room air conditioning, as well as the difficulty in identifying physical or technological characteristics that would consistently differentiate between equipment used for these two types of applications in all cases. Accordingly, DOE is proposing a revised definition of "computer room air conditioner" that would focus on the equipment's use, its testing and certification under a test procedure specifically tailored to computer room air conditioners, and confirmation that the basic model is not a covered consumer product to which energy conservation standards apply. DOE believes that this revised approach would ensure that the computer room air conditioner equipment class does not improperly expand to other comfort-conditioning applications where other energy conservation standards apply. To assist in making these distinctions, the SNOPR's proposed definition of "computer room air conditioner" provides physical characteristics to help guide manufacturers in determining whether their equipment meets the definition of "computer room air conditioner." DOE wishes to make clear that its proposal would do nothing to prevent

properly rated and certified comfort-conditioning air conditioners from also being marketed and sold in computer room applications. However, DOE's proposed definition is intended to ensure that certification to the new computer room air conditioner standards remains limited to basic models devoted to such applications. These changes are discussed in further detail in section III.A of this SNOPR.

The proposed changes to the test procedures are described in detail in III.B of this SNOPR. Primarily, DOE proposes to further modify the DOE test procedures in order to provide clarifications of several test parameters that are not explicitly addressed in the previously proposed test procedures but are currently found in AHRI operations manuals, which guide the AHRI-member manufacturers in applying the DOE test procedures to their equipment. In some cases, DOE has made modifications to the wording that is used in AHRI's operations manuals. Specifically, DOE is proposing to adopt provisions to specify how manufacturers should determine the refrigerant charge and fans speeds/air flow rates for testing. Further, DOE is proposing clarifications to the allowance of manufacturer involvement in VRF testing. DOE is also proposing to adopt refrigerant line length correction factors for variable refrigerant flow systems that are contained in the AHRI operations manual for that equipment with some limitations on their use. DOE also proposes modification to the regulatory text where necessary to reflect DOE's interpretation of the test procedure by clarifying several other testing issues described below, including certified rating tolerances, defective samples, test set-up, and enhancement devices. DOE tentatively determined in the January 2012 NOPR and reaffirms in today's SNOPR that none of the proposed changes would alter the measured efficiency of covered products.

### III. Discussion

#### A. Definition of “Computer Room Air Conditioner”

In the January 2012 NOPR, DOE tentatively concluded that because ASHRAE expanded the scope of Standard 90.1 to include air conditioners and condensing units serving computer rooms, the scope of DOE’s obligations pursuant to EPCA with regard to ASHRAE products similarly expanded to encompass these products. 77 FR 2356, 2372 (Jan. 17, 2012). Thus, DOE analyzed the technological feasibility and economic justification of adopting efficiency levels for computer room air conditioners that are more stringent than those in ASHRAE Standard 90.1-2010, as required by EPCA, and proposed to adopt new standards for computer room air conditioners at the same levels as those specified in ASHRAE Standard 90.1-2010. *Id.* at 2416-18. The term “computer room air conditioner” had not been defined under DOE’s regulations because such units had not previously been covered equipment. As a result, in the January 2012 NOPR, DOE proposed to adopt the following definition for “computer room air conditioner”:

*Computer Room Air Conditioner* means a unit of commercial package air conditioning and heating equipment that is advertised, marketed, and/or sold specifically for use in computer rooms, data processing rooms, or other precision cooling applications, and is rated for performance using ASHRAE Standard 127, (incorporated by reference, see §431.95). Such equipment may not be marketed or advertised as equipment for any other space conditioning applications, and may not be rated for performance using AHRI Standard 210/240 or AHRI Standard 340/360. (incorporated by reference, see §431.95).

77 FR 2356, 2425-26 (Jan. 17, 2012).

DOE presented the proposed definition at the February 2012 public meeting for the ASHRAE equipment NOPR, and received feedback from interested parties that indicated concerns about the proposed definition of “computer room air conditioner.” In particular, Panasonic indicated concern that the proposed definition might require the same equipment to be certified to multiple test methods – one for comfort cooling and one for computer room applications. (Panasonic, Public Meeting Transcript, No. 20 at p. 62) Mitsubishi expressed concern that the proposed definition would prevent equipment that is designed primarily for use in comfort conditioning (and thus not rated using ASHRAE Standard 127) but that may also be suitable for computer room service from being installed in all potential applications. (Mitsubishi, Public Meeting Transcript, No. 20 at pp. 60-61) In an attempt to alleviate these concerns, DOE is proposing modifications to this definition in today’s SNOPR to assist manufacturers in determining what equipment is considered a “computer room air conditioner” under DOE’s proposed regulations.

In developing a definition for “computer room air conditioner,” DOE first looked to existing industry definitions in ASHRAE Standard 90.1 and ASHRAE Standard 127. ASHRAE Standard 90.1-2010 does not provide a definition of “computer room air conditioner,” but rather, it defines a “computer room,” thereby clarifying the use/location but not the technology suitable for that location.<sup>3</sup> In terms of applying its efficiency levels, ASHRAE Standard 90.1-2010 states that “[a]ir conditioners primarily serving computer rooms and covered by ASHRAE Standard 127 shall meet the requirements in Table 6.8.1K. All other air conditioners shall meet the requirements in Table 6.8.1A.” Table 6.8.1K in ASHRAE Standard 90.1-2010 provides the

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<sup>3</sup> ASHRAE Standard 90.1-2010 defines “Computer Room” as “a room whose primary function is to house equipment for the processing and storage of electronic data and that has a design electronic data equipment power density exceeding 20 watts/ft<sup>2</sup> of conditioned floor area.”

minimum efficiency levels for computer room air conditioners that DOE proposed adopting in the January 2012 NOPR.

ASHRAE Standard 127-2007 (Method of Testing for Rating Computer and Data Processing Room Unitary Air-Conditioners) provides a definition for “computer and data processing room (CDPR) unitary air conditioner.”<sup>4</sup> In addition, the first public review draft of proposed revisions to ASHRAE 127-2007 (i.e., ASHRAE 127-2007R, Proposed Revision of Standard 127-2007, Method of Testing and Rating Computer and Data Processing Room Unitary Air Conditioners) defines “CRAC”<sup>5</sup> [computer room air conditioner]. However, no part of the definition of either “CRAC” or “CDPR unitary air conditioner” clearly differentiates the design of CRACs from other direct expansion cooling equipment.

As discussed in the January 2012 NOPR, DOE was not able to identify any physical construction and/or component characteristic(s) of computer room air conditioners that distinguish those products from conventional comfort-cooling air conditioners. 77 FR 2356, 2382-83 (Jan. 17, 2012). After hearing the concerns raised at the February 2012 public meeting, DOE again attempted to develop a definition for “computer room air conditioner” that effectively distinguishes these products from other types of commercial air conditioners. DOE considered characteristics such as evaporator-to-condenser effective surface area ratio and

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<sup>4</sup> ASHRAE Standard 127-2007 defines “computer and data processing room (CDPR) unitary air conditioner” as “a computer and data processing room unitary air conditioner consisting of one or more factory-made assemblies, which include a direct expansion evaporator or chilled water cooling coil, an air-moving device, and air filtering devices. The air conditioner may include a compressor, condenser, humidifier, or reheating function. Where direct expansion equipment is provided in more than one assembly and the separate assemblies are to be used together, the requirements of rating outlined in this standard are based upon the use of matched assemblies. The functions of a CDPR air conditioner, either alone or in combination with a cooling and heating plant, are to provide air filtration, circulation, cooling, reheating, and humidity control.”

<sup>5</sup> ASHRAE Standard 127-2007R Proposed Revision of Standard 127-2007, Method of Testing for Rating Computer and Data Processing Room Unitary Air Conditioners defines “computer room air conditioner (CRAC)” as “computer room air conditioner; generally refers to computer-room cooling units that utilize dedicated compressors and refrigerant cooling coils rather than chilled-water coils.”



delivered cubic feet per minute (CFM) per ton of capacity, as well as the presence of certain features such as an integrated humidifier, temperature and/or humidity control of the supplied air, and reheating function. Based upon its review, DOE notes that many, but not all, computer room air conditioners may have features such as an integrated humidifier, temperature and/or humidity control of the supplied air, and reheating function. However, DOE could not identify any single characteristic or combination of characteristics that would consistently differentiate between the two types of equipment, the same reasoning which led DOE to propose a definition in the January 2012 NOPR based upon how the equipment is marketed and/or sold for use, rather than upon physical characteristics.

At the February 2012 public meeting, Mitsubishi stated that the most distinguishing characteristic of CRAC equipment is that it has the ability to apply cooling operation at very low temperatures. (Mitsubishi, Public Meeting Transcript, No. 20 at p. 99) Although DOE recognizes that many computer room air conditioners are deemed “mission critical” equipment and are expected to operate year round regardless of the outdoor conditions, DOE is also aware that other types of commercial air conditioners can be designed to operate under low ambient temperature conditions (through the use of “low ambient” control packages). At the public meeting, Mitsubishi stated that certain comfort-cooling equipment it manufactures also has the ability to operate under low ambient conditions, and, thus, such equipment can be used in some computer room applications. (Mitsubishi, Public Meeting Transcript, No. 20 at p. 99) DOE notes that many self-contained water-cooled air conditioners and heat pumps also can operate under low ambient conditions. As a result, a commercial air conditioner’s ability to apply cooling operation at very low temperatures is not a differentiating characteristic on which to base

the definition, because it would not differentiate computer room air conditioners from other conventional comfort-conditioning air conditioners.

The Department considered all of these potential differentiating characteristics when developing a definition of “computer room air conditioner” but ultimately determined that none of these factors could be used to definitively distinguish computer room air conditioners from conventional comfort-conditioning air conditioners. However, upon considering the comments at the NOPR public meeting, DOE believes that specifying certain physical characteristics in the definition that may be present in computer room air conditioners will assist manufacturers in determining which equipment falls under the definition of “computer room air conditioner” and which equipment falls under the definitions for other types of commercial package air conditioners. Therefore, DOE has proposed in today’s SNOPR to include some of the physical characteristics listed above in the revised definition of “computer room air conditioner.”

Given the above-discussed difficulties in distinguishing computer room air conditioners from comfort-conditioning air conditioners based solely upon differences in physical construction and/or component characteristics, DOE is proposing to instead specify that products satisfying the definition of “computer room air conditioner” are (by definition) certified to DOE’s test procedure for CRACs (see §431.96), and any other covered comfort-conditioning air conditioners must still be rated and certified to their applicable test procedure and energy conservation standards (either residential or commercial).

By definition, “industrial equipment” (generally applicable to ASHRAE equipment) “is not a ‘covered product’ as defined in section 6291(a)(2)....” (42 U.S.C. 6311(2)(A)(iii)) Under 42 U.S.C. 6291(2), the term “covered product” means a consumer product of a type listed in 42

U.S.C. 6292, Coverage; central air conditioners and central air conditioning heat pumps are specifically included at 42 U.S.C. 6292(a)(3). Furthermore, the definition of “consumer product” at 42 U.S.C. 6291(1) specifically captures a type of product, which, to any significant extent, is distributed in commerce for personal use or consumption by individuals. Thus, if a basic model of central air conditioner is found to any significant extent in consumer applications, it would appropriately be a residential central air conditioner subject to 10 CFR 430.32(c).

For air-conditioning equipment that is properly classified as commercial and industrial equipment, DOE notes that there is already a comprehensive set of standards at 10 CFR 431.97 for a variety of types of commercial air-conditioning and heating equipment used in comfort-conditioning applications. Similar to the principle stated above, if a basic model of commercial air-conditioning equipment is found to any significant extent in comfort-conditioning applications, the manufacturer would be required to test and certify the basic model to the applicable comfort-conditioning air conditioner test procedure and standard under 10 CFR 431.97. If the manufacturer, at its discretion, wishes to make representations as to the basic model’s performance as a comfort-conditioning air conditioner and a computer room air conditioner, then the basic model would need to be tested using the DOE test procedures for each equipment type. However, DOE believes that in most cases, the manufacturer would decide upon the primary purpose of each given basic model in its product offering and choose the equipment type associated with that basic model for the purposes of testing and certification.

Once the manufacturer identifies the applicable equipment type of the basic model, the applicable DOE test procedure provisions for rating, standards for compliance, and certification requirements should be easy to identify. DOE is not proposing to modify any certification requirements in this rulemaking. Nothing in DOE’s proposal would bar a manufacturer from

making representations of the same basic model performing as two equipment types as long as those ratings are based on testing using the DOE testing procedures for each equipment type.

In consideration of the above points, DOE is proposing to define “computer room air conditioner” as follows:

*Computer room air conditioner* means a basic model of commercial package air-conditioning and heating equipment that is: (1) used in computer rooms, data processing rooms, or other purpose-specific cooling applications; (2) rated for sensible coefficient of performance (SCOP) and tested in accordance with 10 CFR 431.96; and (3) not a covered, consumer product under 42 U.S.C. 6291(1)-(2) and 6292. A computer room air conditioner may be provided with, or have as available options, an integrated humidifier, temperature and/or humidity control of the supplied air, and reheating function.

Additionally, DOE clarifies that any basic model that meets the definition of “commercial package air-conditioning and heat equipment” must be classified as one of the equipment types (e.g., small, large, or very large commercial package air-conditioning and heat equipment, packaged terminal air conditioners or heat pumps, variable refrigerant flow systems, computer room air conditioners, and single package vertical units) for the purposes of determining the applicable test procedure and energy conservation standard. While DOE is permitting manufacturers to make this election based on a comparison of each basic model with DOE’s regulatory definitions for the various equipment types, DOE is adding a new section to the beginning of 10 CFR 431.97 to make it clear that each manufacturer of a basic model that meets this definition does have a regulatory obligation in terms of standards compliance. Accordingly, DOE is proposing the following revision to 10 CFR 431.97:

(a) All basic models of commercial package air-conditioning and heating equipment must be tested for performance using the applicable DOE test procedure in §431.96, be compliant with the applicable standards set forth in paragraphs (b) through (f) of this section, and be certified to the Department under 10 CFR part 429.

DOE believes that the amended definition of “computer room air conditioner” would not restrict any types of commercial air-conditioning equipment from being installed in computer rooms, but rather, that it clarifies which air conditioners must be tested and certified as computer room air conditioners under DOE’s regulatory program. DOE seeks comment on its proposed definition of “computer room air conditioner” and the clarifications proposed to 10 CFR 431.97(a) regarding commercial package air-conditioning and heating equipment. These are identified as issues 1 and 2 in section V.B, “Issues on Which DOE Seeks Comment.”

DOE would also like to take this opportunity to address another potential approach raised at the February 2012 public meeting. More specifically, several interested parties suggested use of the term “precision” air conditioner to identify this equipment class. Panasonic stated that it is opposed to this equipment being termed “computer room air conditioning” equipment, because there are other systems that could be used for computer rooms. (Panasonic, Public Meeting Transcript, No. 20 at p. 92) Danfoss stated that there could be a standard for precision computer room air conditioning equipment and one for conventional commercial air conditioning equipment. (Danfoss, Public Meeting Transcript, No. 20 at p. 103) Panasonic stated that the term “precision air conditioning” would be more appropriate for use, rather than computer room air conditioning, because precision air conditioning would not restrict the market. (Panasonic, Public Meeting Transcript, No. 20 at p. 105) Danfoss stated that specialized equipment might be used in a laboratory with very strict climate control needs, which might have the same type of

requirements but not be a computer room. (Danfoss, Public Meeting Transcript, No. 20 at p. 105)

Mitsubishi supported these comments and the use of the term “precision air conditioner.”

(Mitsubishi, Public Meeting Transcript, No. 20 at p. 105)

As noted in the January 2012 NOPR, DOE believes ASHRAE Standard 90.1 does not cover commercial package air-conditioning and heating equipment used for industrial, manufacturing, or commercial processes, with the exception of the specific industrial equipment listed in the standard (i.e., “air conditioners and condensing units serving computer rooms”). 77 FR 2356, 2373 (Jan. 17, 2012). DOE intends its standards for commercial package air-conditioning and heating equipment to have the same scope as ASHRAE Standard 90.1 and to apply only to equipment used for comfort space conditioning, with the exception of those equipment types listed in ASHRAE Standard 90.1 that are used for commercial or industrial processes. See further discussion in the January 2012 NOPR regarding the “Coverage of Commercial Package Air Conditioning and Heating Equipment That Are Exclusively Used as Part of Industrial or Manufacturing Processes.” 77 FR 2356, 2372-2373 (Jan. 17, 2012).

ASHRAE Standard 90.1-2010 does not refer to or use the term “precision air conditioner.” The process cooling application that has been listed in ASHRAE Standard 90.1 specifically refers to cooling of computer rooms (i.e., “air conditioners and condensing units serving computer rooms”). Given these factors, DOE has tentatively concluded that DOE’s proposed use of the term “computer room air conditioner” would be in line with the equipment covered by ASHRAE Standard 90.1-2010 and that use of the term “precision air conditioner” would not be appropriate.

## B. Test Procedures

EPCA requires DOE to amend any test procedures for ASHRAE equipment to the latest version generally accepted by the industry or the rating procedures developed or recognized by industry, as referenced in ASHRAE/IES Standard 90.1, unless the Secretary determines that clear and convincing evidence exists that the latest version of the industry test procedure does not meet the requirements for test procedures described under 42 U.S.C. 6314(a)(2)-(3).<sup>6</sup> (42 U.S.C. 6314(a)(4)(A)-(B)) In the January 2012 NOPR, DOE proposed to adopt the updated industry test procedures for the following equipment: small commercial package air conditioners and heating equipment (AHRI 210/240-2008, Performance Rating of Unitary Air-Conditioning & Air-Source Heat Pump Equipment), large and very large commercial package air conditioners and heating equipment (AHRI 340/360-2007, Performance Rating of Commercial and Industrial Unitary Air-Conditioning and Heat Pump Equipment), commercial warm-air furnaces (UL 727-2006, Standard for Safety for Oil-Fired Central Furnaces, and ANSI Z21.47-2006, Standard for Gas-Fired Central Furnaces), and commercial water heaters (ANSI Z21.10.3-2004, Gas Water Heaters, Volume III, Storage Water Heaters with Input Ratings Above 75,000 Btu Per Hour, Circulating and Instantaneous). In the May 2011 NODA and the January 2012 NOPR, DOE reviewed each of these test procedures and described the changes in comparison to the previous version of the test procedure. 76 FR 25622, 25634-37 (May 5, 2011) and 76 FR 2356, 2373-76 (Jan. 17, 2012).

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<sup>6</sup> The relevant statutory provisions at 42 U.S.C. 6314(a)(2)-(3) state that test procedure shall be reasonably designed to produce test results which reflect energy efficiency, energy use, and estimated operating costs of a type of industrial equipment and shall not be unduly burdensome to conduct. If the test procedure is a procedure for determining estimated annual operating costs, such costs shall be calculated from measurements of energy use in a representative average-use cycle.

Additionally, in the January 2012 NOPR, DOE proposed to adopt new test procedures for measuring the efficiency of variable refrigerant flow equipment (AHRI 1230-2010, Performance Rating of Variable Refrigerant Flow (VRF) Multi-Split Air-Conditioning and Heat Pump Equipment), computer room air conditioners (ASHRAE 127-2007, Method of Testing for Rating Computer and Data Processing Room Unitary Air Conditioners), and single package vertical air conditioners and single package vertical heat pumps (AHRI 390-2003, Performance Rating of Single Package Vertical Air-Conditioners and Heat Pumps). An initial assessment of these test procedures is also presented in the January 2012 NOPR. 76 FR 2356, 2376-79 (Jan. 17, 2012).

DOE presented its proposed changes to the test procedures for ASHRAE equipment at the February 2012 public meeting. At the meeting, interested parties indicated that DOE should review the AHRI operations manuals<sup>7</sup> and, if necessary, adopt parts of the manuals that contain provisions relevant to testing that would impact or help clarify DOE's proposed test procedures. Specifically, AHRI commented that the organization has been running certification and verification programs for years, and in each program, there is an operations manual that describes the verification program and clarifies how to run the test procedure. AHRI encouraged DOE to look at these operations manuals and reference them in any way DOE can. (AHRI, Public Meeting Transcript, No. 20 at p. 48) Mitsubishi also commented that it would be essential for DOE to incorporate the operations manual in the case of VRF systems, because the operations manual has additional guidance on how to set up the systems and what the manufacturer requires in order to do the testing. (Mitsubishi, Public Meeting Transcript, No. 20 at p. 48)

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<sup>7</sup> For more information and to access those operations manuals, visit AHRI's website at: <http://www.ahrinet.org/ahri+certification+programs.aspx>.



In response, DOE reviewed the industry operations manuals developed by AHRI to determine whether the manuals provide information that would help clarify the application of the DOE test procedures and those updates that were proposed in the January 2012 NOPR. In its review, DOE found that several AHRI operations manuals provide guidance that DOE believes could be useful in clarifying the DOE test procedures. This guidance, which is in part proposed for inclusion in DOE’s test procedures, is presented in Table III.1 and discussed in detail in the subsections immediately below.

**Table III.1 Summary of Issues Identified Through Review of AHRI Operations Manuals**

Issue	AHRI OM*	Relevant OM Section	Summary of Issue	Summary of Response
Compressor Break-In Period	Small Unitary OM	3.8 (Break-in Operation of Test Units)	Certain AHRI OMs allow manufacturers the option of “breaking in” equipment by running the unit before testing. Depending on the equipment, AHRI allows up to 16 hours, up to 24 hours, or a manufacturer-specified number of hours.	DOE is proposing to add a “break-in” provision to its test procedures for commercial air conditioning and heating equipment. However, DOE is only proposing to allow up to 16 hours to break in equipment, regardless of the equipment class.
	Large Unitary OM	3.7 (Break-in Operation and Start-up of Test Units)		
	VRF OM	3.7 (Break-in Operation and Start-up of Test System)		
	SPVU OM	3.7 (Optional “Break-In” Period)		
Tolerances	Multiple OMs	N/A	Certain AHRI OMs and certain industry test methods provide tolerances to evaluate manufacturer efficiency ratings.	Compliance with DOE standards is based on a statistically valid set of samples, as specified at 10 CFR part 429, and DOE is not proposing to adopt tolerances from AHRI OMs in the final rule.
Defective Samples	Multiple OMs	N/A	Certain AHRI OMs provide criteria by which a unit would be considered defective.	DOE determines whether a unit is defective on a case-by-case basis as part of its regulatory program using the guidelines in 10 CFR part 429 and is not proposing to adopt AHRI’s provisions for what constitutes a defective sample.
Test Set-Up	Commercial Furnaces OM	3.3.5.4 (Sample Start-Up and Operation)	Certain AHRI OMs allow the opportunity for a manufacturer or test lab to use a “test procedure	DOE is not proposing to adopt AHRI OM “test procedure guidelines” or to allow for the use of “punch
		3.12 (Clarification		

		in Running of the Test Procedure)	guideline” or a “punch list” to help facilitate implementation of the DOE test procedure.	lists.” DOE proposes to use only information found in the DOE test procedures in 10 CFR part 431 and in Installation and Operation (I&O) manuals when conducting testing.
	Commercial Water Heaters OM	3.3.5.4 (Sample Start-Up and Operation)		
		3.10 (Clarification of Test Procedures)		
	SPVU OM	3.6 (Test Set-up and Start-up Punch List)		
Enhancement Devices	Small Unitary OM	3.6 (System Manufacturer’s Required Equipment Provisions)	Certain AHRI OMs state that manufacturers shall provide a complete system including “other listed system enhancement devices.”	DOE will only consider those devices which are part of the rated basic model, are shipped with the unit, and are clearly described as enhancement devices in the I&O manuals.
		3.7 (ICM’s Required Equipment Provisions)		
		5.8 (Listing Equipment with Enhancement Components)		
	Large Unitary OM	3.6 (Required Equipment Provisions)		
Refrigerant Charge	General OM	9.11.1.1 (Test Sample Refrigerant Charge)	Certain AHRI OMs give the manufacturer additional guidance on how to charge the system for testing.	DOE proposes to add clarification to its test procedures that if a range of refrigerant charges is specified in the I&O manuals, then any charge in that range is acceptable for use in testing, unless a rating value is clearly specified in the I&O manual.
	Small Unitary OM	3.19 (Test Sample Refrigerant Charge)		
	VRF OM	3.15 (Test Sample Refrigerant Charge) and 3.15.1 (Refrigerant Charge Adjustment)		
Fan Speeds and Air Flow Rates, Rated vs. Nominal	General OM	9.11.1.2 (Fan Speed)	Certain AHRI OMs and the test procedures allow manufacturers to adjust the indoor air flow rate as long as it is under a specified limit and meets minimum external static pressure requirements.	DOE proposes to add clarification to its test procedures that the air flow rate to be used for testing should be clearly specified in the I&O manuals. If rated air flow values for DOE testing are not clearly identified then a default value of 400 standard cubic feet per minute (scfm) per ton will be used.
	Large Unitary OM	3.11 (Indoor Coil Airflow Rate)		
Manufacturer Involvement During VRF	VRF OM	3.8 (Duties of Testing Laboratory Personnel)	The AHRI OM for VRF equipment allows manufacturers to lock in the	DOE proposes to allow limited manufacturer involvement in ensuring the

Testing		3.10 (System Stabilization for Testing)	compressor and fan motor speeds in order to achieve steady-state operation and allows manufacturers to assist in the set up and start up of this equipment during AHRI verification testing.	system has been set up correctly, including setting the compressor speed during DOE regulatory testing, provided that the manufacturers document their set-up and record their fixed compressor speeds.
Correction Factors for VRF Refrigerant Line Lengths	VRF OM	3.9 (Refrigerant Line Length Considerations)	The AHRI OM for VRF equipment provides a table of cooling capacity correction factors in the event that a testing laboratory exceeds the minimum refrigerant line length specified in AHRI 1230.	DOE proposes to adopt the correction factors but only in the instance where the physical limitations of the laboratory prevent it from setting up the test without exceeding the minimum refrigerant line lengths.

\* Small Unitary OM means Unitary Small Air-Conditioners and Air-Source Heat Pumps (Includes Mixed-Match Coils) (Rated Below 65,000 Btu/h) Certification Program Operations Manual; Large Unitary OM means Unitary Large Equipment Certification Program Operations Manual; VRF OM means Variable Refrigerant Flow Multi-Split Air-Conditioners and Heat Pumps Certification Program (rated up to 760,000 Btu/h) Operations Manual; SPVU OM means Single Packaged Vertical Air-Conditioners and Heat Pumps Certification Program Operations Manual; Commercial Furnaces OM means Commercial Furnaces Certification Program Operations Manual; Commercial Water Heater OM means Commercial Water Heaters Certification Program Operations Manual.

## 1. Compressor Break-In Period

The DOE test procedure for commercial air-conditioning equipment does not provide for a compressor “break-in” period prior to initiating testing. According to several AHRI operations manuals for commercial air-conditioning equipment, manufacturers may direct AHRI to run the tested unit’s compressor for a certain amount of time before running DOE’s test procedure. In the January 2012 NOPR, DOE proposed to allow an optional compressor “break-in” period of no longer than 16 hours as part of the proposed adoption of AHRI 210/240-2008, AHRI 340/360-2007, AHRI 390-2003, and AHRI 1230-2010, and requested comment on allowing the break-in period for tests conducted using ASHRAE 127-2007. 77 FR 2356, 2374, 2376-78 (Jan. 17, 2012).

The 16-hour break-in limit aligns with the limit indicated in the AHRI operations manual for unitary large air conditioners and heat pumps.<sup>8</sup> Other AHRI operations manuals that provide for a compressor break-in period either specify a different time limit or allow the manufacturer to specify the break-in period. For example, the VRF Multi-Split Air-Conditioners and Heat Pumps Operations Manual allows for a compressor break-in period of up to 24 hours, and the operations manuals for unitary small air conditioners and heat pumps and for SPVUs do not specify a time limit for the “break-in” period, instead deferring to manufacturer specifications.

DOE reiterates the proposal set forth in the January 2012 NOPR, providing the manufacturer the option of breaking in the compressor for up to 16 hours for all equipment types. Due to the general similarities between the compressors used in large unitary equipment and other types of commercial air conditioning equipment, DOE believes that a compressor break-in time of up to 16 hours is adequate and appropriate to ensure test results that are representative of the energy efficiency of the basic model during average use.

For assessment and enforcement testing purposes, DOE would use the compressor break-in period used by the manufacturer, if any, when it performed certification testing, up to 16 hours. A manufacturer who elects to use an optional compressor break-in period in its certification testing should record this information (including the duration) in the test data underlying the certified ratings that is required to be maintained under 10 CFR 429.71. DOE seeks comment as to whether a longer break-in period is necessary for VRF systems, small air conditioners and heat pumps, and SPVUs, and why these types of equipment need a longer

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<sup>8</sup> For more information, see section 3.7 of the AHRI Operations Manual for Unitary Large Equipment, available at: [http://www.ahrinet.org/App\\_Content/ahri/files/Certification/OM%20pdfs/2012/ULE%20OM-2012.pdf](http://www.ahrinet.org/App_Content/ahri/files/Certification/OM%20pdfs/2012/ULE%20OM-2012.pdf).

break-in period. This is identified as issue 3 in section V.B, “Issues on Which DOE Seeks Comment.”

## 2. Certified Ratings

Many AHRI operations manuals and certain test procedures proposed in the January 2012 NOPR to be incorporated by reference into DOE regulations contain guidance on the tolerance that AHRI applies in its verification program to determine whether a given basic model is properly rated. For example, the AHRI operations manual for commercial furnaces<sup>9</sup> states in section 3.9 (Tolerances) that if a piece of equipment tests below 95 percent of its rated efficiency, then it fails its AHRI verification test. DOE has received numerous inquiries regarding the use of the AHRI tolerances in DOE’s regulatory program as it may relate to certification, assessment, and/or enforcement testing. Consistent with the language in the January 2012 NOPR and DOE’s current practice, current DOE regulations do not provide for a 5-percent tolerance across its regulatory program. Instead, DOE’s regulations call for a statistical evaluation of a test sample, as explained below. As such, DOE is not proposing to adopt such provisions for a general 5-percent tolerance in the final rule and is proposing to explicitly exclude them from industry standards incorporated by reference.

Under current DOE regulations, a manufacturer must determine its certified ratings for its products and equipment from values derived pursuant to the applicable testing and sampling requirements set forth in 10 CFR parts 429, 430, and 431. For the products covered by this

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<sup>9</sup> The AHRI Commercial Furnaces Operations Manual is available at:  
[http://www.ahrinet.org/App\\_Content/ahri/files/Certification/OM%20pdfs/2012/CFRN%20OM-2012.pdf](http://www.ahrinet.org/App_Content/ahri/files/Certification/OM%20pdfs/2012/CFRN%20OM-2012.pdf).

rulemaking, the sampling requirements incorporate a 95-percent confidence limit based on testing a sample of sufficient size (no less than 2 units per basic model). DOE's sampling plan for certification testing allows for some variation in the manufacturing and testing processes. More information on DOE's sampling plans can be found in 10 CFR part 429, more specifically at 10 CFR 429.43 for commercial HVAC equipment and at 10 CFR 429.44 for commercial water-heating equipment.

In the March 2011 final rule addressing certification, compliance, and enforcement, DOE reiterated its authority under the statute that DOE may, at any time, test a basic model to assess whether the basic model is in compliance with the applicable energy conservation standard(s). See 10 CFR 429.104; 76 FR 12422, 12495 (March 7, 2011). For an "assessment test," DOE obtains one or more units for testing, generally from retailers or distributors, and frequently performs the testing without the knowledge of the manufacturer. For an "enforcement test," DOE issues a test notice requiring the manufacturer to provide units for testing. DOE uses the results of assessment testing as one tool when determining whether to pursue enforcement testing. DOE does not apply a tolerance to the results of an assessment test to determine whether to pursue enforcement testing. DOE may pursue enforcement testing if it has reason to believe that a basic model is not in compliance with applicable standards (10 CFR 429.110(a))—a determination that is informed but not necessarily driven by the assessment test results.

DOE has set forth different sampling plans for DOE enforcement testing of covered equipment and certain low-volume covered products, which include many of the products that are the subject of this rulemaking proceeding, including built-to-order products. These sampling plans utilize a test sample of no more than 4 units for low-volume, built-to-order basic models,

which include many of the products that are the subject of this rulemaking proceeding. These sampling plans are set forth in Appendix B to subpart C to part 429.

### 3. Defective Samples

AHRI operations manuals contain guidance on determining whether a sample is defective. This determination typically is based on how closely the AHRI verification test results correlate to the product's rated performance. The AHRI general OM manual provides, "A Defective Sample is one that fails a test due to the sample's inability to operate in accordance with the Participant's installation and operating instructions because it suffers an anomaly making it inconsistent with other samples of the same model. Unit design, unit assembly, quality control issues, and/or the Participant's inability to rate the product correctly will not be accepted by AHRI as causes for defect."

DOE determines whether a unit is defective on a case-by-case basis as part of its certification and enforcement program. DOE's guidelines for determining whether a unit is defective are contained at 10 CFR 429.110(d)(3), which provides, "A test unit shall be considered defective if such unit is inoperative or is found to be in noncompliance due to failure of the unit to operate according to the manufacturer's design and operating instructions." DOE is retaining its current approach and will evaluate the circumstances regarding the enforcement test results on a per-unit basis for a given basic model on a case-by-case basis. In DOE's view, additional clarification may be overly restrictive and may result in a unit of a sample being determined defective due simply to high variability in the performance of a given basic model.

#### 4. Test Set-Up

In many of AHRI's product-specific operations manuals, AHRI states that the start-up and operation of a unit shall be in accordance with the installation and operation instructions shipped with the sample. As DOE has previously stated in this rulemaking, DOE agrees and proposed to use the installation and operation instructions shipped with the sample. However, in some cases (e.g., commercial water heaters and commercial warm-air furnaces), the AHRI OM provides for the use of a "test procedure guideline" intended to facilitate "proper" performance of the DOE test procedure. The operations manuals add that "such guidelines shall not revise or modify the basic DOE test procedure ... but shall seek to provide uniformity in interpretation of terms, measurements, and application of procedures."<sup>10</sup> Likewise, the operations manual for single package vertical air conditioners and heat pumps requires that manufacturers provide a "punch list" specific to performance testing that contains specific information needed to facilitate the testing of a given basic model (if any).

DOE has not proposed to incorporate by reference any industry test procedure guidelines or provisions for "punch lists" into its test procedures. DOE reiterates that any provisions of the operations manuals, industry test procedure guidelines, or any other guidelines or provisions that are not in DOE's test procedure or issued as the Department's official interpretation of the

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<sup>10</sup> For more information, see section 3.10 of the AHRI Commercial Water Heater Operations Manual, available at: [http://www.ahrinet.org/App\\_Content/ahri/files/Certification/OM%20pdfs/2012/CWH%20OM-2012.pdf](http://www.ahrinet.org/App_Content/ahri/files/Certification/OM%20pdfs/2012/CWH%20OM-2012.pdf), or section 3.12 of the AHRI Commercial Furnaces Operations Manual, available at: [http://www.ahrinet.org/App\\_Content/ahri/files/Certification/OM%20pdfs/2012/CFRN%20OM-2012.pdf](http://www.ahrinet.org/App_Content/ahri/files/Certification/OM%20pdfs/2012/CFRN%20OM-2012.pdf).



regulations in the DOE guidance database<sup>11</sup> are not part of the DOE regulatory structure. Accordingly, DOE will not use any of these types of documents during DOE's assessment and enforcement testing. DOE will use the individual basic model's installation and operation manual. DOE accepts questions regarding the application of its test procedures when areas requiring clarification are identified or ambiguities arise. The DOE guidance database provides interested parties a way of submitting test procedure questions and industry-developed guidance for DOE review and response. DOE utilizes this guidance process as interim clarification until DOE's test procedure regulations can be periodically updated through rulemaking.

## 5. Enhancement Devices

The AHRI Operations Manuals for Unitary Small Air-Conditioners and Heat Pumps and Unitary Large Equipment provide that system manufacturers shall provide a complete system including "other listed system enhancement devices" for verification testing purposes.<sup>12</sup> While DOE is unclear exactly what is meant by "other listed system enhancement devices," DOE will only consider a device to be part of a basic model for certification, assessment, and/or enforcement testing purposes if the device is shipped with the unit from the point of manufacture and is clearly described as required equipment in the equipment's I&O manual. If an enhancement device is necessary for a basic model to meet minimum energy conservation standards, all units of the basic model must be shipped with any required enhancement device,

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<sup>11</sup> Available at: <http://www1.eere.energy.gov/guidance/default.aspx?pid=2&spid=1..>

<sup>12</sup> For more information, see sections 3.6, 3.7, and 5.8 of the AHRI Operations Manual for Unitary Small Air-Conditioners and Air-source Heat Pumps, available at: [http://www.ahrinet.org/App\\_Content/ahri/files/Certification/OM%20pdfs/2012/USE%20OM-2012.pdf](http://www.ahrinet.org/App_Content/ahri/files/Certification/OM%20pdfs/2012/USE%20OM-2012.pdf), and section 3.6 of the AHRI Operations Manual for Unitary Large Equipment, available at: [http://www.ahrinet.org/App\\_Content/ahri/files/Certification/OM%20pdfs/2012/ULE%20OM-2012.pdf](http://www.ahrinet.org/App_Content/ahri/files/Certification/OM%20pdfs/2012/ULE%20OM-2012.pdf).

and the installation and operational manual should include a description of the unit's operation with such a device.

## 6. Refrigerant Charge

AHRI's General Operations Manual states that the laboratory must "determine the refrigerant charge at the Standard Rating Condition in accordance with instructions from the [manufacturer's] installation and operational manuals."<sup>13</sup> The operations manual also states that, "for a given specified range of superheat, sub-cooling, or refrigerant pressure, the average of the range shall be used to determine the refrigerant charge. If multiple instructions are given, the [manufacturer] shall be asked to sign off on the preferred method." Similarly, the AHRI VRF Operations Manual states that in the event of a verification test failure, the manufacturer has the "option to charge the unit between the minimum and maximum of the range. The Laboratory may consult with the [manufacturer] about the refrigerant charging procedures and make any needed corrections as long as they do not contradict the published installation instructions."<sup>14</sup>

DOE's current test procedures for commercial air conditioners and heat pumps greater than 65,000 Btu/h and for VRF systems do not provide a method for determining the refrigerant charge for testing if the manufacturer only specifies a range of refrigerant charges or in the event of an assessment and/or enforcement test failure. Thus, to provide clarity in its test procedures,

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<sup>13</sup> For more information, see section 9.11.1.1 of the AHRI General Operations Manual, available at: [http://www.ahrinet.org/App\\_Content/ahri/files/Certification/2012%20General%20OM.PDF](http://www.ahrinet.org/App_Content/ahri/files/Certification/2012%20General%20OM.PDF).

<sup>14</sup> For more information, see section 3.15 of the AHRI Operations Manual for Variable Refrigerant Flow Multi-Split Air-Conditioners and Heat Pumps, available at: [http://www.ahrinet.org/App\\_Content/ahri/files/Certification/OM%20pdfs/2012/VRF%20OM-2012.pdf](http://www.ahrinet.org/App_Content/ahri/files/Certification/OM%20pdfs/2012/VRF%20OM-2012.pdf).

DOE proposes that if a manufacturer specifies a range of superheat, sub-cooling, and/or refrigerant pressure in its I&O manuals, any value(s) within that range may be used to determine refrigerant charge or mass of refrigerant for purposes of assessment and/or enforcement testing, unless the manufacturer clearly specifies a rating value in its I&O manuals. Note that in all cases, the laboratory conducting the assessment and/or enforcement test shall not ask the manufacturer to provide, and shall not consider, any instructions outside of those specified in the I&O manuals shipped with the unit.

#### 7. Fan Speeds and Air Flow Rates, Rated versus Nominal

AHRI's General Operations Manual states that "unless specified in writing, Laboratory personnel shall not make adjustments to fan speed." Also, the Unitary Large Equipment Operations Manual states "if the rated cfm is not obtained at the required external static pressure ... the [manufacturer] shall change the cfm rating by adjusting the speed of the fan motor or supply alternate drives."

The DOE test procedures specify only an upper limit to the indoor air flow rate based on nominal capacity. Manufacturers can adjust the indoor air flow rate to any point below that limit when conducting certification testing, provided that the system, as tested, maintains DOE's minimum external static pressure requirements throughout the duration of the test.

DOE has found that in most instances, manufacturers rate their equipment using an indoor airflow rate that differs from the nominal airflow rate (typically 400 cfm/ton) for a given basic model. While DOE understands that manufacturers may submit their rated air flow rate as

part of AHRI's Certification, DOE will only use those test parameters and conditions, including air flow rate, that are set forth in the installation and operation manuals being shipped to the commercial customer with the basic model, are clearly identified in the installation and operation manuals as being used in the testing to generate the DOE performance ratings, and are allowed by the applicable DOE test procedure.

DOE reiterates its position from the January 2012 NOPR that if manufacturers have specific conditions or instructions used in generating their energy efficiency ratings, they must be clearly provided in the I&O manual shipped with the unit. 77 FR 2356, 2378 (Jan. 17, 2012). If DOE finds that the rated information, such as airflow rates, is not specified in the I&O manual shipped with the unit, DOE will test using a default value of 400 standard cubic feet per minute (scfm) per ton of cooling capacity. DOE realizes that testing under nominal, as opposed to rated, conditions may negatively impact the equipment's energy efficiency performance; however, in DOE's view, the commercial customer has a right to know the operating conditions that are used to generate the certified efficiency values, including rated airflow and rated capacity.

#### 8. Manufacturer Involvement During Variable Refrigerant Flow Multi-Split Air-Conditioners and Heat Pumps Assessment and/or Enforcement Testing

The DOE test procedure incorporated by reference for Variable Refrigerant Flow Multi-Split Air-Conditioner and Heat Pumps (VRF), AHRI 1230-2010, states that "if the equipment cannot be maintained at steady state conditions by its normal controls, then the manufacturer shall modify or over-ride such controls so that steady state conditions are achieved." The VRF Operations Manual provides that manufacturers are allowed to assist in the set up and start up of

this equipment during AHRI verification testing, because skilled personnel with knowledge of the control software specific to the equipment being tested are required to ensure proper test set-up and valid test results. This provision in the VRF OM limits manufacturer involvement during start-up and testing to only regulating the compressor motor speed control. Similarly, the VRF OM states that if the equipment does not stabilize within two hours of fixing the compressor speed, the manufacturer may adjust the control operation of the system to meet the requirements of the standard.

DOE understands the complexity of the VRF systems and will allow a manufacturer representative to witness assessment and/or enforcement testing. DOE is proposing that the manufacturer representative will also be allowed to adjust the compressor speed during testing. Manufacturers should document their certification test set-up, including fixed compressor speeds, and maintain this documentation as part of their test data underlying certification so that DOE can request the documentation from the manufacturers on an as-needed basis. The documentation must be detailed enough about the set-up, such that it can be recreated by a laboratory technician without further manufacturer assistance. However, DOE acknowledges that a VRF manufacturer's representative will be allowed on-site for DOE-initiated testing to verify set-up per the documentation. DOE will only use set-up instructions from the testing underlying the manufacturer's certified ratings for DOE verification and enforcement testing. Also, the manufacturer must designate the maximum, minimum, and any intermediate speeds used during certification testing (as required under AHRI 1230-2010); these speeds should be documented in the test data underlying certification.

DOE does not typically allow manufacturers to witness or be involved in DOE-initiated assessment and/or enforcement testing of commercial air conditioning and heating equipment,

and consequently, this allowance for VRF systems represents a departure of DOE's current practices. DOE has received comment that DOE is adopting an inequity between VRF systems and unitary systems. In response, DOE has tentatively concluded that there are unique circumstances governing the installation and operation of VRF systems that require intimate knowledge of the product control software in order to ensure that the system can operate properly during assessment and/or enforcement testing. Further, DOE believes that unlike the unitary market, a representative from the VRF manufacturer's company typically provides on-site expertise when product VRF system is being installed in a given commercial building in order to help ensure proper operation. DOE seeks additional comment from interested parties regarding its proposal to allow limited manufacturer involvement in the testing of VRF systems. This is identified as issue 4 in section V.B, "Issues on Which DOE Seeks Comment."

#### 9. Correction Factors for VRF Refrigerant Line Lengths

The VRF OM provides correction factors for the cooling capacity of the VRF system in the event that the refrigerant line length used in the test set-up exceeds the length specified in AHRI 1230-2010. The VRF OM provides that if the test facility does not set up the test using the minimum required lengths, the test facility will apply a correction factor to the cooling capacity when establishing the certified ratings to correct for the lost capacity due to a longer-than-required refrigerant line. The correction factor makes test results more comparable across different laboratories and testing set-ups.

DOE is proposing to adopt correction factors as part of the DOE test procedures for commercial VRF systems to a limited extent. DOE proposes to limit the use of the correction to

instances in which the physical constraints of the laboratory prevent it from setting up a given basic model for test in accordance with the piping lengths specified in Table 3 of AHRI 1230-2007, thereby making it a matter of necessity. In all other circumstances, DOE expects laboratories to use proper refrigerant line lengths as a matter of course.

Table III.2 shows the refrigerant line length correction factors DOE proposes to adopt, which are equivalent to those found in AHRI's VRF OM. DOE believes that the correction factors would allow manufacturers to produce test results that are a better representation of the average energy efficiency for this equipment and are more comparable to results of testing across test facilities.

**Table III.2 Refrigerant Line Length Correction Factors**

<b>Piping length beyond minimum, X (ft)</b>	<b>Piping length beyond minimum, Y (m)</b>	<b>Cooling Capacity Correction, %</b>
$0 > X \leq 20$	$0 > Y \leq 6.1$	1%
$20 > X \leq 40$	$6.1 > Y \leq 12.2$	2%
$40 > X \leq 60$	$12.2 > Y \leq 18.3$	3%
$60 > X \leq 80$	$18.3 > Y \leq 24.4$	4%
$80 > X \leq 100$	$24.4 > Y \leq 30.5$	5%
$100 > X \leq 120$	$30.5 > Y \leq 36.6$	6%

DOE is seeking comment on its proposal to incorporate into its test procedures the refrigerant line length correction factors. This is identified as issue 5 in section V.B, "Issues on Which DOE Seeks Comment."

#### 10. Corrections to the January 2012 Notice of Proposed Rulemaking

In the January 2012 NOPR, DOE inadvertently referenced incorrect titles for certain industry test procedure standards by improperly identifying the year of the standard. Specifically, DOE referenced “ANSI Z21.10.3-2006” at certain places in the January 2012 NOPR, but intended to reference “ANSI Z21.10.3-2004,” which is the latest version of the standard referenced in ASHRAE Standard 90.1-2010. Additionally, DOE referenced “AHRI 340/360-2004” in some places in the January 2012 NOPR, but intended to reference “AHRI 340/360-2007,” which is the latest version of the standard referenced in ASHRAE Standard 90.1-2010. DOE is clarifying in this SNOPR that it proposes to adopt ANSI Z21.10.3-2004 for commercial water heaters and AHRI 340/360-2007 for large and very large commercial package air conditioners and heat pumps.

#### **IV. Procedural Issues and Regulatory Review**

DOE has concluded that the determinations made pursuant to the various procedural requirements applicable to the January 17, 2012 NOPR remain unchanged for this SNOPR. 77 FR 2356, 2419-22. The additional changes proposed in this SNOPR (a refined definition of “computer room air conditioner” and updates to the DOE test procedures based on information found in industry operations manuals) would not be expected to increase testing burden beyond what is specified in the January 17, 2012 NOPR.



## **V. Public Participation**

### **A. Submission of Comments**

DOE will accept comments, data, and information regarding this SNO PR no later than the date provided in the **DATES** section at the beginning of this notice. Interested parties may submit comments, data, and other information using any of the methods described in the **ADDRESSES** section at the beginning of this notice.

Submitting comments via [www.regulations.gov](http://www.regulations.gov). The [www.regulations.gov](http://www.regulations.gov) web page will require you to provide your name and contact information. Your contact information will be viewable to DOE Building Technologies staff only. Your contact information will not be publicly viewable except for your first and last names, organization name (if any), and submitter representative name (if any). If your comment is not processed properly because of technical difficulties, DOE will use this information to contact you. If DOE cannot read your comment due to technical difficulties and cannot contact you for clarification, DOE may not be able to consider your comment.

However, your contact information will be publicly viewable if you include it in the comment itself or in any documents attached to your comment. Any information that you do not want to be publicly viewable should not be included in your comment, nor in any document attached to your comment. Otherwise, persons viewing comments will see only first and last

names, organization names, correspondence containing comments, and any documents submitted with the comments.

Do not submit to [www.regulations.gov](http://www.regulations.gov) information for which disclosure is restricted by statute, such as trade secrets and commercial or financial information (hereinafter referred to as Confidential Business Information (CBI)). Comments submitted through [www.regulations.gov](http://www.regulations.gov) cannot be claimed as CBI. Comments received through the website will waive any CBI claims for the information submitted. For information on submitting CBI, see the Confidential Business Information section below.

DOE processes submissions made through [www.regulations.gov](http://www.regulations.gov) before posting. Normally, comments will be posted within a few days of being submitted. However, if large volumes of comments are being processed simultaneously, your comment may not be viewable for up to several weeks. Please keep the comment tracking number that [www.regulations.gov](http://www.regulations.gov) provides after you have successfully uploaded your comment.

Submitting comments via email, hand delivery/courier, or mail. Comments and documents submitted via email, hand delivery, or mail also will be posted to [www.regulations.gov](http://www.regulations.gov). If you do not want your personal contact information to be publicly viewable, do not include it in your comment or any accompanying documents. Instead, provide your contact information in a cover letter. Include your first and last names, email address,

telephone number, and optional mailing address. The cover letter will not be publicly viewable as long as it does not include any comments.

Include contact information each time you submit comments, data, documents, and other information to DOE. If you submit via mail or hand delivery/courier, please provide all items on a compact disc (CD), if feasible, in which case it is not necessary to submit printed copies. No telefacsimiles (faxes) will be accepted.

Comments, data, and other information submitted to DOE electronically should be provided in PDF (preferred), Microsoft Word or Excel, WordPerfect, or text (ASCII) file format. Provide documents that are not secured, that are written in English, and that are free of any defects or viruses. Documents should not contain special characters or any form of encryption and, if possible, they should carry the electronic signature of the author.

Campaign form letters. Please submit campaign form letters by the originating organization in batches of between 50 to 500 form letters per PDF or as one form letter with a list of supporters' names compiled into one or more PDFs. This reduces comment processing and posting time.

Confidential Business Information. Pursuant to 10 CFR 1004.11, any person submitting information that he or she believes to be confidential and exempt by law from public disclosure should submit via email, postal mail, or hand delivery/courier two well-marked copies: one copy of the document marked confidential including all the information believed to be confidential, and one copy of the document marked non-confidential with the information believed to be confidential deleted. Submit these documents via email or on a CD, if feasible. DOE will make its own determination about the confidential status of the information and treat it according to its determination.

Factors of interest to DOE when evaluating requests to treat submitted information as confidential include: (1) A description of the items; (2) whether and why such items are customarily treated as confidential within the industry; (3) whether the information is generally known by or available from other sources; (4) whether the information has previously been made available to others without obligation concerning its confidentiality; (5) an explanation of the competitive injury to the submitting person which would result from public disclosure; (6) when such information might lose its confidential character due to the passage of time; and (7) why disclosure of the information would be contrary to the public interest.

It is DOE's policy that all comments may be included in the public docket, without change and as received, including any personal information provided in the comments (except information deemed to be exempt from public disclosure).

## B. Issues on Which DOE Seeks Comment

Although DOE welcomes comment on any aspect of this proposal, DOE is particularly interested in receiving comments and views of interested parties concerning the following issues:

1. The proposed definition of “computer room air conditioner.”
2. The clarifications proposed to 10 CFR 431.97(a) regarding commercial package air-conditioning and heating equipment.
3. Whether a longer break-in period is necessary for VRF systems, small air conditioners and heat pumps, and SPVUs, and, if so, why these equipment require a longer break-in period.
4. The proposal to allow limited manufacturer involvement in the testing of VRF systems.
5. The proposal to incorporate applicable industry refrigerant line length correction factors into the DOE test procedure.

## **VI. Approval of the Office of the Secretary**

The Secretary of Energy has approved publication of today's supplemental notice of proposed rulemaking.

### **List of Subjects in 10 CFR Part 431**

Administrative practice and procedure, Confidential business information, Energy conservation, Incorporation by reference, Reporting and recordkeeping requirements.

Issued in Washington, DC, on March 19, 2012.

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Kathleen B. Hogan  
Deputy Assistant Secretary for Energy Efficiency  
Energy Efficiency and Renewable Energy

For the reasons set forth in the preamble, DOE proposes to amend part 431 of Chapter II, Subchapter D, of Title 10 of the Code of Federal Regulations as set forth below:

## **PART 431 – ENERGY EFFICIENCY PROGRAM FOR CERTAIN COMMERCIAL AND INDUSTRIAL EQUIPMENT**

1. The authority citation for part 431 continues to read as follows:

**Authority:** 42 U.S.C. 6291-6317.

2. Section 431.92 is amended by adding the definition “Computer room air conditioner” in alphabetical order to read as follows:

### **§431.92 Definitions concerning commercial air conditioners and heat pumps.**

\* \* \* \* \*

*Computer room air conditioner* (1) Means a basic model of commercial package air-conditioning and heating equipment that is:

(i) Used in computer rooms, data processing rooms, or other purpose-specific cooling applications;

(ii) Rated for sensible coefficient of performance (SCOP) and tested in accordance with 10 CFR 431.96; and

(iii) Not a covered, consumer product under 42 U.S.C. 6291(1)-(2) and 6292.

(2) A computer room air conditioner may be provided with, or have as available options, an integrated humidifier, temperature and/or humidity control of the supplied air, and reheating function.

\* \* \* \* \*

3. Revise §431.96 to read as follows:

**§ 431.96 Uniform test method for the measurement of energy efficiency of commercial air conditioners and heat pumps.**

(a) Scope. This section contains test procedures for measuring, pursuant to EPCA, the energy efficiency of any small, large, or very large commercial package air-conditioning and heating equipment, packaged terminal air conditioners and packaged terminal heat pumps, computer room air conditioners, variable refrigerant flow systems, and single package vertical air conditioners and single package vertical heat pumps.

(b) Testing and calculations. Determine the energy efficiency of each type of covered equipment by conducting the test procedure(s) listed in the rightmost column of Table 1 of this section along with any additional testing provisions set forth in paragraphs (c), (d), and (e) of this section, that apply to the energy efficiency descriptor for that equipment, category, and cooling



capacity. Note, the omitted sections of the test procedures listed in the rightmost column of Table 1 of this section shall not be used.

**Table 1 to §431.96 - Test Procedures for Commercial Air Conditioners and Heat Pumps**

<b>Equipment type</b>	<b>Category</b>	<b>Cooling capacity</b>	<b>Energy efficiency descriptor</b>	<b>Use tests, conditions and procedures<sup>1</sup> in</b>
Small Commercial Packaged Air-Conditioning and Heating Equipment	Air-Cooled, 3-Phase, AC and HP	<65,000 Btu/h	SEER and HSPF	AHRI Standard 210/240-2008 (omit section 6.5)
	Air-Cooled AC and HP	≥65,000 Btu/h and <135,000 Btu/h	EER and COP	AHRI Standard 340/360-2007 (omit section 6.3)
	Water-Cooled and Evaporatively-Cooled AC	<65,000 Btu/h	EER	AHRI Standard 210/240-2008 (omit section 6.5)
		≥65,000 Btu/h and <135,000 Btu/h	EER	AHRI Standard 340/360-2007 (omit section 6.3)
	Water-Source HP	<135,000 Btu/h	EER and COP	ISO Standard 13256-1 (1998)
Large Commercial Packaged Air-Conditioning and Heating Equipment	Air-Cooled AC and HP	≥135,000 Btu/h and <240,000 Btu/h	EER and COP	AHRI Standard 340/360-2007 (omit section 6.3)
	Water-Cooled and Evaporatively-Cooled AC	≥135,000 Btu/h and <240,000 Btu/h	EER	AHRI Standard 340/360-2007 (omit section 6.3)
Very Large Commercial Packaged Air-Conditioning and Heating Equipment	Air-Cooled AC and HP	≥240,000 Btu/h and <760,000 Btu/h	EER and COP	AHRI Standard 340/360-2007 (omit section 6.3)
	Water-Cooled and Evaporatively-Cooled AC	≥240,000 Btu/h and <760,000 Btu/h	EER	AHRI Standard 340/360-2007 (omit section 6.3)
Packaged Terminal Air Conditioners and	AC and HP	<760,000 Btu/h	EER and COP	AHRI Standard 310/380-2004 (omit section

Heat Pumps				5.6)
Computer Room Air Conditioners	AC	<760,000 Btu/h	SCOP	ASHRAE Standard 127-2007 (omit section 5.11)
Variable Refrigerant Flow Multi-split Systems	AC and HP	<760,000 Btu/h	EER and COP	AHRI Standard 1230-2010 (omit sections 5.1.2 and 6.6)
Single Package Vertical Air Conditioners and Single Package Vertical Heat Pumps	AC and HP	<760,000 Btu/h	EER and COP	AHRI Standard 390-2003 (omit section 6.4)

<sup>†</sup> Incorporated by reference, see §431.95.

(c) *Optional break-in period for tests conducted using AHRI 210/240-2008, AHRI 340/360-2007, AHRI 1230-2010, and AHRI 390-2003.* Manufacturers may optionally specify a “break-in” period, not to exceed 16 hours, to operate the equipment under test prior to conducting the test method specified by AHRI 210/240-2008, AHRI 340/360-2007, AHRI 1230-2010, or AHRI 390-2003. A manufacturer who elects to use an optional compressor break-in period in its certification testing should record this information (including the duration) in the test data underlying the certified ratings that is required to be maintained under 10 CFR 429.71.

(d) *Refrigerant line length corrections for tests conducted using AHRI 1230-2010.* For test setups where it is physically impossible for the laboratory to use the required line length listed in Table 3 of the AHRI 1230-2010 Standard, then the actual refrigerant line length used by the laboratory may exceed the required length and the following correction factors are applied:

Piping length beyond minimum, X (ft)	Piping length beyond minimum, Y (m)	Cooling Capacity Correction, %
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$0 > X \leq 20$	$0 > Y \leq 6.1$	1%
$20 > X \leq 40$	$6.1 > Y \leq 12.2$	2%
$40 > X \leq 60$	$12.2 > Y \leq 18.3$	3%
$60 > X \leq 80$	$18.3 > Y \leq 24.4$	4%
$80 > X \leq 100$	$24.4 > Y \leq 30.5$	5%
$100 > X \leq 120$	$30.5 > Y \leq 36.6$	6%

(e) *Additional provisions for equipment set-up.* The only additional specifications that may be used in setting up the basic model for test are those set forth in the installation and operation manual shipped with the unit. Each unit should be set up for test in accordance with the manufacturer installation and operation manuals. Paragraphs (e)(1) through (e)(3) of this section provide specifications for addressing key information typically found in the installation and operation manuals.

(1) If a manufacturer specifies a range of superheat, sub-cooling, and/or refrigerant pressure in its installation and operation manual for a given basic model, any value(s) within that range may be used to determine refrigerant charge or mass of refrigerant, unless the manufacturer clearly specifies a rating value in its installation and operation manual in which case the specified rating value shall be used.

(2) The air flow rate used for testing must be that set forth in the installation and operation manuals being shipped to the commercial customer with the basic model and clearly identified as that used to generate the DOE performance ratings. If a rated air flow value for testing is not clearly identified, a value of 400 standard cubic feet per minute (scfm) per ton shall be used.

(3) For VRF systems, the test set-up and the fixed compressor speeds (*i.e.*, the maximum, minimum, and any intermediate speeds used for testing) should be recorded and maintained as

part of the test data underlying the certified ratings that is required to be maintained under 10 CFR 429.71.

(f) *Manufacturer involvement in assessment or enforcement testing for variable refrigerant flow systems.* A manufacturer's representative will be allowed to witness assessment and/or enforcement testing for VRF systems. The manufacturer's representative will be allowed to inspect and discuss set-up only with a DOE representative and adjust the compressor speed during testing in the presence of a DOE representative. Only previously documented specifications for set-up as specified under paragraphs (d) and (e) of this section will be used.

4. In §431.97, redesignate paragraphs (a), (b), (c), (d), and (e) as proposed January 17, 2012, at 77 FR 2427, as paragraphs (b), (c), (d), (e), and (f) respectively and add a new paragraph (a) to read as follows:

**§ 431.97      Energy efficiency standards and their effective dates.**

(a) All basic models of commercial package air-conditioning and heating equipment must be tested for performance using the applicable DOE test procedure in §431.96, be compliant with the applicable standards set forth in paragraphs (b) through (f) of this section, and be certified to the Department under 10 CFR part 429.

\*       \*       \*       \*       \*

